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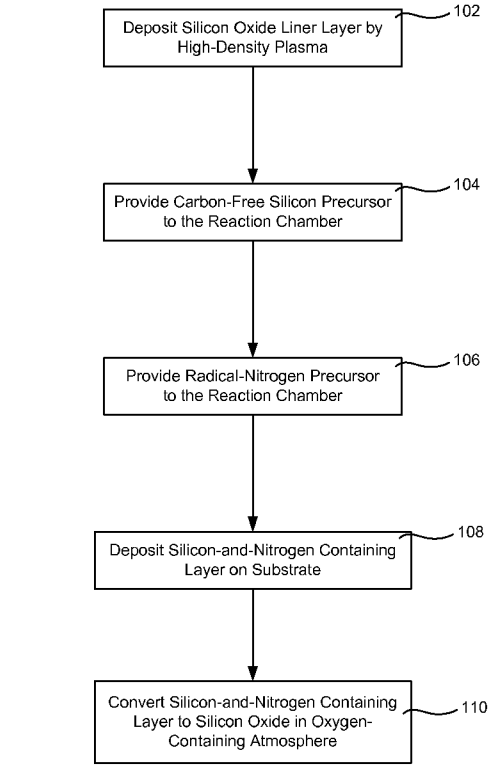
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(54) Title: STRESS MANAGEMENT FOR TENSILE FILMS

FIG 1



(57) Abstract: The formation of a gap-filling silicon oxide layer with reduced tendency towards cracking is described. The deposition involves formation of a flowable silicon-containing layer which facilitates the filling of trenches. Subsequent processing at high substrate temperature causes less cracking in the dielectric film than flowable films formed in accordance with methods in the prior art. A compressive liner layer deposited prior to the formation of the gap-filling silicon oxide layer is described and reduces the tendency for the subsequently deposited film to crack. A compressive capping layer deposited after a flowable silicon-containing layer has also been determined to reduce cracking. Compressive liner layers and compressive capping layers can be used alone or in combination to reduce and often eliminate cracking. Compressive capping layers in disclosed embodiments have additionally been determined to enable an underlying layer of silicon nitride to be transformed into a silicon oxide layer.

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